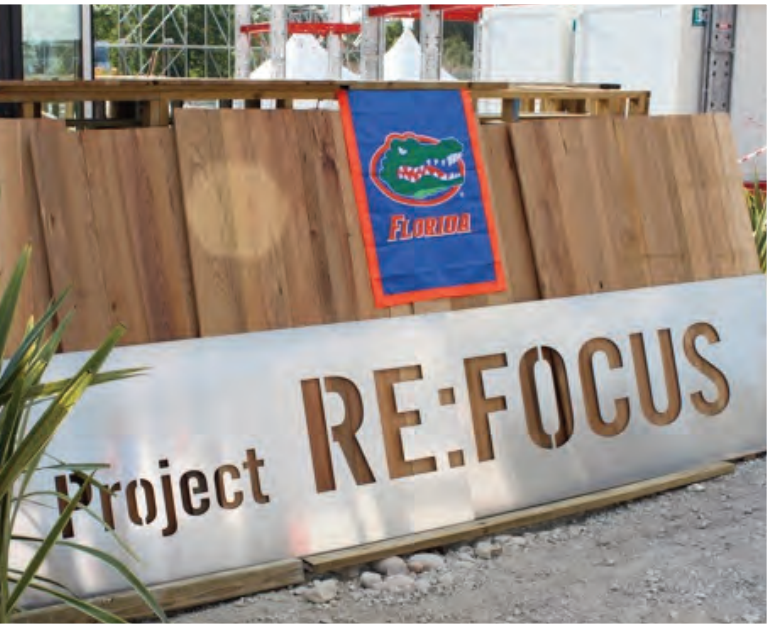
Solar Decathlon Europe

Madrid, Spain

Residential



Crestron Green Light® Energy Management Technology Helps University of Florida Student Builders to a Strong Finish at International Green Home Competition

Background

In 1999, the United States Department of Energy created the Solar Decathlon competition, in which university teams competed with solar houses they designed and built. The main purpose of the competition is to select the most energy efficient, sustainable and comfortable solar house, which is determined through a series of ten tests undertaken by each team. Within a decade, the competition has become one of the most prestigious international events.

In 2010 the first Solar Decathlon Europe was held in Madrid. From dozens of international entries, only 17 universities were selected to compete, including two from the United States.

Using Crestron Green Light® environmental control technology in its sustainable model home, the University of Florida's M.E. Rinker, Sr. School of Building Construction won first place in Communications and Social Awareness (user-friendliness and interactive experience) and second place in the Production vs. Use category.

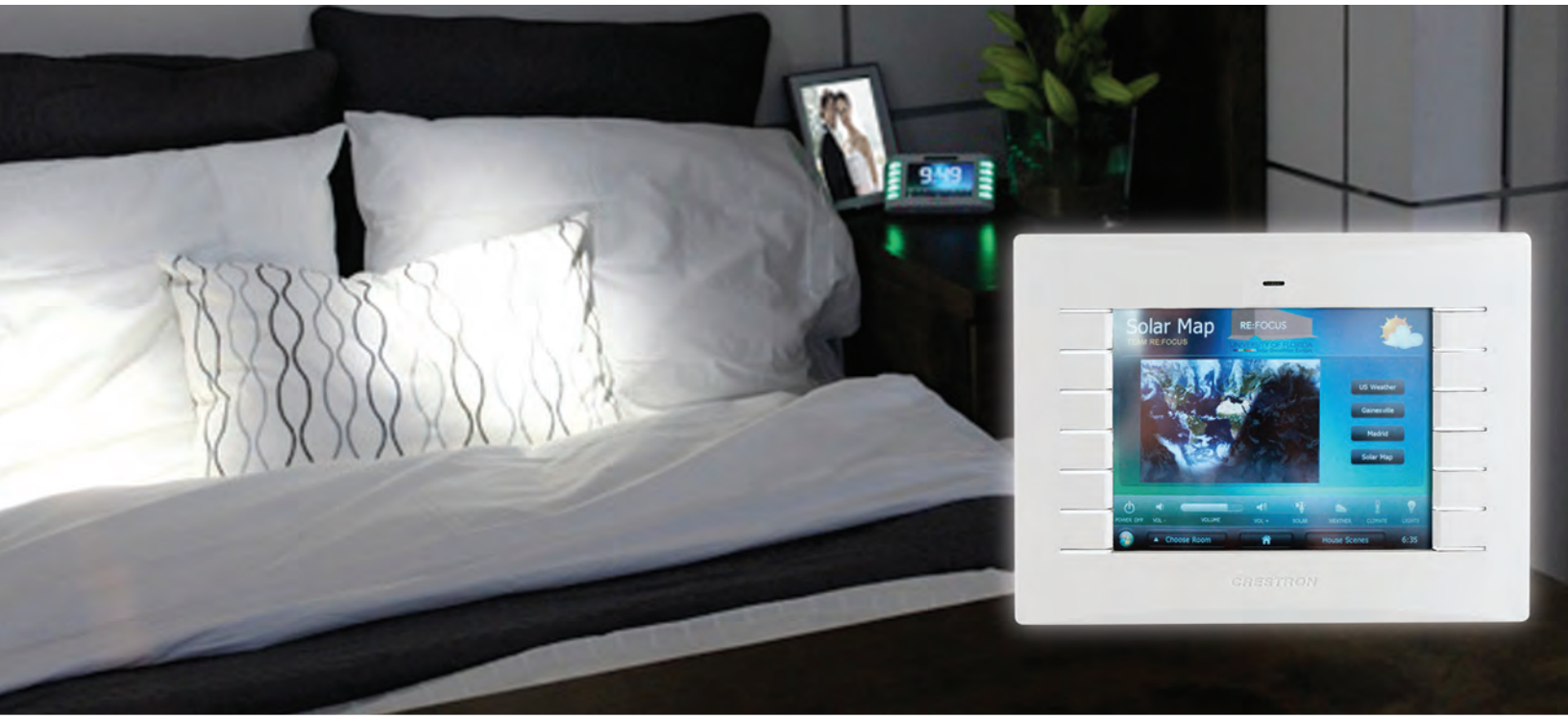
"Our strong showing in the "Production vs. Use" category is obviously a nod to the photovoltaic panels, but also to the monitoring and controls of the system," said project faculty advisor James Sullivan, LEED-AP and Associate Professor at the prestigious architectural school. "The house was monitored for accuracy by the judges, and the Crestron system allowed the house to be programmed in line with the competition setting and rules. It was amazing."

The Challenge

While attempting to build an eco-friendly house over a hectic 8-day build schedule, decathletes were faced with the challenge of harnessing, processing, storing and using solar energy to create self-sufficient, sustainable and industrialized homes, whose design and construction corresponds with the modern lifestyle.

Each university team was required to build their home with the goal of competing in various contest categories including architecture, construction and engineering, solar systems and hot water, usage, comfort and more. Teams were given a build schedule of only eight days.

According to SD Europe officials, the houses at Villa Solar, the village where the competition was held, produced nearly



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James Sullivan, LEED-AP and Associate Professor

three times the energy consumed during the 10-day competition: 6,177 kWh produced while only 2,579 kWh were consumed.

The Solution

"Jim Sullivan invited me to teach a few sessions to his Building and Construction students and the Solar Decathlon team about the options for control systems," explains Bill Lally, owner of Mode:Green, a Crestron CAIP and design/programming firm specializing in green integrated building technology. "They were looking at several options when I got involved in the design aspects of the project, so I explained to them the power and flexibility of what Crestron could do in this house."

A fully integrated Crestron energy management solution was selected to monitor and control all environmental systems.

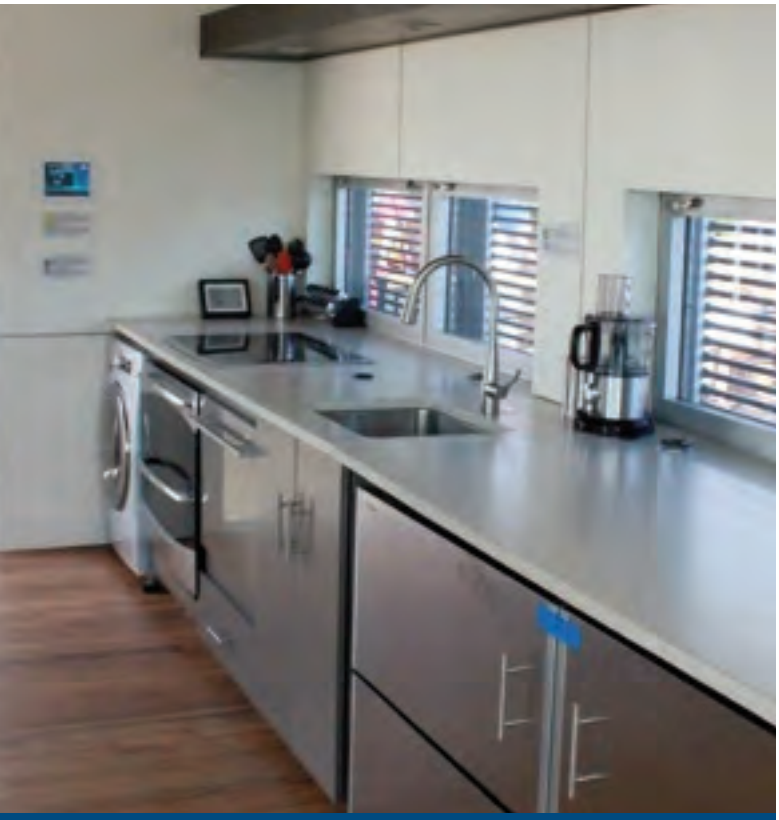
Simple, fully integrated control of all lighting, HVAC and audio/video, plus interactive information for solar and electrical consumption is easily accessed and controlled from a variety of intuitive Crestron touchpanels and keypads. Popular models used include a TPMC-8L 8.4" Wallmount, TPS-6X 5.7" Wireless tabletop, TPMC-3X 2.8" WiFi Handheld, and a TPMC-4SM 4.3" PoE Wallmount.

Crestron thermostats, lighting controllers, dimmers, occupancy sensors and a CEN-IDOCV docking station for Apple iPod® complete the winning energy management design.

"We installed Crestron because of the power and flexibility of the system," said Lally. "This was a complex implementation, and Crestron's ability to integrate the various features seamlessly was a key for our team."

Systems at a Glance

The UF solar home, named RE:FOCUS, is driven by a Mode: Green custom designed and programmed Crestron control system. The primary sustainable design element is the optimization of electricity being produced by the Sun Power solar panels and Solyndra photovoltaics mounted on the roof and sides of the structure.



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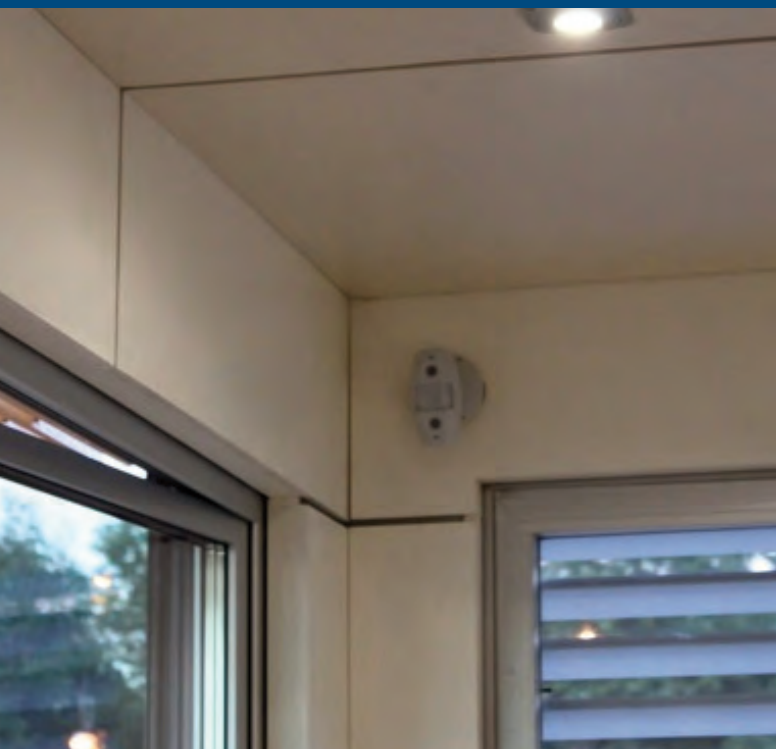

"When all systems are properly balanced, the house is able to generate significantly more power than it consumes," explained Lally.

The panels are connected to three Solar Boy inverters that convert solar energy into the necessary voltages needed to power the various systems in the house. The inverters report this information, which is compared to the energy requirements for the house, and the control system can be optimized accordingly.

Environmental systems, including HVAC and high efficiency LED lighting, are monitored for real-time power draw as well as comparators that measure energy being produced by the solar system versus what power may be needed from the utility grid during nights.

How the System Works

"The system has two unique strengths – programming and integration – which may be the same for some," said Sullivan. "Programmatically the flexibility and ability of Bill Lally allowed for student input and enabled the system to meet the goals of the competition. Integration allowed for the system to control various systems in the house through one interface. This was very powerful for our team, even more so when it comes to an eight-day build schedule."

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> **Bill Lally,** Owner, Mode:Green

All energy data is fed into the Crestron Green Light® system for comparison. A Crestron DIN Rail 2-Series Automation Lighting Processor and multiple DIN Rail 4-Channel Dimmers handle lighting control for the entire dwelling. One-touch presets enable a selection of custom energy saving lighting scenes from any touchpanel or handheld.

Other unique custom features include:

- TPMC-8L hard button preset that opens a U of FL website summarizing the competition and history of the house – this played a role in social awareness aspects.
- Dynamic graphic solar maps display on touchpanels to track and correlate solar production.
- Weather reporting information for Gainesville, Madrid and the US.
- TPMC-8L hard button preset that plays the Florida Gators fight song.

Crestron Green Light GLS Dual-Technology Occupancy Sensors integrated with astronomical clocks and motorized shading contribute substantial efficiencies toward harvesting daylight and reducing or welcoming interior and exterior lighting as needed.

Crestron CHV-RTHS remote temperature/humidity sensors and CHV-TSTAT programmable thermostats and remote temperature sensors keep room climates at optimal levels, while enabling accurate manual adjustments from any touchscreen or keypad.

With accurate 2-way feedback functionality, occupants can access all environmental system information via the touchpanels, as well as real-time weather information from Madrid and across the US. A dynamic solar map shows the current daylight position of the earth in real-time.

With all the focus on energy conservation and the environment, the fun stuff was not forgotten. For entertainment, occupants can play music or videos with the help of the CEN-IDOCV docking station for iPod®. Streaming media services such as Flickr and Pandora can also be played through the IP-based television or any touchpanel.

“The strengths of the equipment and logic of the system speak for themselves,” concludes Sullivan. “Powerful, integrated, and programmable.”

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